

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
22 August 2002 (22.08.2002)

PCT

(10) International Publication Number  
**WO 2002/064631 A3**

(51) International Patent Classification<sup>7</sup>: **C07K 14/705**,  
C12N 15/12, 15/62, C07K 16/18, C12Q 1/68, C12N 5/10,  
G01N 33/50

(74) Agents: **TESKIN, Robin, L.** et al.; Crowell & Moring,  
L.L.P., 1001 Pennsylvania Avenue, N.W., Washington,  
D.C. 20004 (US).

(21) International Application Number:  
PCT/US2002/000198

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,  
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,  
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,  
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,  
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,  
MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG,  
SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,  
VN, YU, ZA, ZM, ZW.

(22) International Filing Date: 3 January 2002 (03.01.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/259,227 3 January 2001 (03.01.2001) US  
60/284,547 19 April 2001 (19.04.2001) US

(84) Designated States (*regional*): ARIPO patent (GH, GM,  
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),  
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR,  
GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent  
(BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR,  
NE, SN, TD, TG).

(71) Applicant (*for all designated States except US*): **SENO-  
MYX, INC.** [US/US]; Suite 160, 11099 N. Torrey Pines  
Road, La Jolla, CA 92037 (US).

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): **ADLER, Jon, Elliott**  
[US/US]; Apt. 15, 1099 Turquoise Street, San Diego, CA  
92109 (US). **LI, Xiaodong** [CN/US]; Apt. 3, 3435 Waco  
Street, San Diego, CA 92117 (US). **STASZEWSKI, Lena**  
[SE/US]; 8270 Calle Nueva, San Diego, CA 92126 (US).  
**O'CONNELL, Shawn** [US/US]; 417 Village Run East,  
Encinitas, CA 92024 (US). **ZOZULYA, Sergey** [RU/US];  
14481 Yazoo Street, San Diego, CA 92129 (US).

Published:

— with international search report

(88) Date of publication of the international search report:  
1 April 2004

*For two-letter codes and other abbreviations, refer to the "Guid-  
ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.*

(54) Title: **T1R TASTE RECEPTORS AND GENES ENCODING SAME**

(57) Abstract: Newly identified mammalian taste-cell-specific G protein-coupled receptors, and the genes and cDNA encoding said receptors are described. Specifically, T1R G protein-coupled receptors active in taste signaling, and the genes and cDNA encoding the same, are described, along with methods for isolating such genes and for isolating and expressing such receptors. Methods for representing taste perception of a particular taste stimulus in a mammal are also described, as are methods for generating novel molecules or combinations of molecules that elicit a predetermined taste perception in a mammal, and methods for simulating one or more tastes. Further, methods for stimulating or blocking taste perception in a mammal are also disclosed.

WO 2002/064631 A3

# INTERNATIONAL SEARCH REPORT

onal Application No  
PCT/US 02/00198

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C07K14/705 C12N15/12 C12N15/62 C07K16/18 C12Q1/68  
C12N5/10 G01N33/50

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C07K C12N C12Q G01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, EMBL, WPI Data, PAJ, MEDLINE, BIOSIS, EMBASE

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages                                                                                                                                                                                                                          | Relevant to claim No.                                                                                                                                                          |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| X          | <p>HOON M A ET AL: "PUTATIVE MAMMALIAN TASTE RECEPTORS: A CLASS OF TASTE-SPECIFIC GPCRS WITH DISTINCT TOPOGRAPHIC SELECTIVITY" CELL, MIT PRESS, CAMBRIDGE, MA,, US, vol. 96, 19 February 1999 (1999-02-19), pages 541-551, XP000922524 ISSN: 0092-8674</p> <p>the whole document</p> <p>---</p> <p>-/--</p> | <p>1-3,<br/>7-13,<br/>17-23,<br/>27-33,<br/>37-43,<br/>47-55,<br/>59-67,<br/>71-79,<br/>83-91,<br/>95-104,<br/>108-178,<br/>182-188,<br/>192-199,<br/>204-212,<br/>216-234</p> |

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

\* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

19 November 2003

Date of mailing of the international search report

09/12/2003

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Mueller, F

# INTERNATIONAL SEARCH REPORT

Int. oral Application No  
PCT/US 02/00198

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages                                                                                                                                                                                                                           | Relevant to claim No.                                                                                                                                                          |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| X          | <p>LI XIAODONG ET AL: "Human receptors for sweet and umami taste"<br/>PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF USA, NATIONAL ACADEMY OF SCIENCE. WASHINGTON, US,<br/>vol. 99, no. 7, 2 April 2002 (2002-04-02),<br/>pages 4692-4696, XP002254830<br/>ISSN: 0027-8424</p> <p>the whole document</p> | <p>1-3,<br/>7-13,<br/>17-23,<br/>27-33,<br/>37-43,<br/>47-55,<br/>59-67,<br/>71-79,<br/>83-91,<br/>95-104,<br/>108-178,<br/>182-188,<br/>192-199,<br/>204-212,<br/>216-234</p> |
| X          | <p>WO 95 08627 A (CIBA GEIGY AG ; FLOR PETER JOSEF (DE); KUHN RAINER (DE); LINDAUER K)<br/>30 March 1995 (1995-03-30)</p> <p>the whole document</p>                                                                                                                                                          | <p>1-3,<br/>7-13,<br/>17-23,<br/>27-33,<br/>37-43,<br/>47-55,<br/>59-67,<br/>71-79,<br/>83-91,<br/>95-104,<br/>108-178,<br/>182-188,<br/>192-199,<br/>204-212,<br/>216-234</p> |
| X          | <p>DATABASE EMBL 'Online!<br/>embl heidelberg;<br/>Acc#: AC062024, 21 June 2000 (2000-06-21)<br/>XP002262036</p> <p>99,721% identity in 1739 bp overlap to claimed seq id 15.<br/>the whole document</p>                                                                                                     | <p>1-3,<br/>7-13,<br/>17-23,<br/>27-33,<br/>37-43,<br/>47-55,<br/>59-67,<br/>71-79,<br/>83-91,<br/>95-104,<br/>108-178,<br/>182-188,<br/>192-199,<br/>204-212,<br/>216-234</p> |

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US 02/00198

| C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT |                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                |
|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Category *                                           | Citation of document, with indication, where appropriate, of the relevant passages                                                                                                                                                                                                | Relevant to claim No.                                                                                                                                                          |
| (X)                                                  | <p>ADLER E ET AL: "A NOVEL FAMILY OF MAMMALIAN TASTE RECEPTORS"<br/>CELL, CELL PRESS, CAMBRIDGE, MA, US,<br/>vol. 100, no. 6,<br/>17 March 2000 (2000-03-17), pages 693-702,<br/>XP000982304<br/>ISSN: 0092-8674<br/>cited in the application</p> <p>the whole document -----</p> | <p>1-3,<br/>7-13,<br/>17-23,<br/>27-33,<br/>37-43,<br/>47-55,<br/>59-67,<br/>71-79,<br/>83-91,<br/>95-104,<br/>108-178,<br/>182-188,<br/>192-199,<br/>204-212,<br/>216-234</p> |

## INTERNATIONAL SEARCH REPORT

national application No.  
PCT/US 02/00198

### Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:  
see FURTHER INFORMATION sheet PCT/ISA/210
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

### Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

#### Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

## Continuation of Box I.2

## Claims Nos.:

4,5,6,14,15,16,24,25,26,34,35,36,44,45,46,56,57,58,68,69,70,80,81,82,92,93,94,105,106,107,179,180etc

## Present claims

4,5,6,14,15,16,24,25,26,34,35,36,44,45,46,56,57,58,68,69,70,80,81,82,92,93,94,105,106,107,179,180,181,189,190,191,201,202,203,213,214,215,relate to an extremely large number of possible compounds/products/apparatus/methods. In fact, the claims contain so many options, variables, possible permutations and provisos that a lack of clarity (and/or conciseness) and support within the meaning of Article 6 PCT arises to such an extent as to render a meaningful search of the claims impossible. Consequently, no search has been carried out for those parts of the application.

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.

# INTERNATIONAL SEARCH REPORT

Int onal Application No  
PCT/US 02/00198

| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
|-------------------------------------------|---------------------|----------------------------|---------------------|
| WO 9508627 A                              | 30-03-1995          | AU 695641 B2               | 20-08-1998          |
|                                           |                     | AU 7615994 A               | 10-04-1995          |
|                                           |                     | CA 2171206 A1              | 30-03-1995          |
|                                           |                     | WO 9508627 A1              | 30-03-1995          |
|                                           |                     | EP 1199359 A1              | 24-04-2002          |
|                                           |                     | EP 0720650 A1              | 10-07-1996          |
|                                           |                     | FI 961251 A                | 18-03-1996          |
|                                           |                     | HU 74247 A2                | 28-11-1996          |
|                                           |                     | JP 9503913 T               | 22-04-1997          |
|                                           |                     | NO 961115 A                | 19-03-1996          |
|                                           |                     | NZ 273015 A                | 22-09-1997          |
|                                           |                     | US 2003113868 A1           | 19-06-2003          |
|                                           |                     | US 6228610 B1              | 08-05-2001          |
|                                           |                     | US 2002127638 A1           | 12-09-2002          |